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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,172	09/10/2003	Haw-Jye Shyu	95.756	1530

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EXAMINER	
PATEL, SHEFALI D	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/662,172	SHYU, HAW-JYE	
	Examiner	Art Unit	
	Shefali D. Patel	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12,14-19 and 23-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12,14-19,23-26,29 and 32* is/are rejected.

7)☒ Claim(s) *27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/14/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 14, 2005 has been entered.

Response to Amendment

2. The amendment was received on July 14, 2005.

3. Claims 1-11, 13 and 20-22 have been cancelled; Claims 24032 are newly added.

4. Claims 12, 14-19 and 23-32 are pending in this application.

Response to Arguments

5. Applicant's arguments with respect to claims 12 and 23 (Remarks on pages 7-10) have been considered but are moot in view of the new ground(s) of rejection.

Information Disclosure Statement

6. The IDS filed on July 14, 2005 states that "Several of the documents listed were either considered during prosecution of the parent application (09/477,811, now U.S. Patent No. 6,724,916). Accordingly, copies of these references are not enclosed." These references are considered as listed on US 6,724,916. There is one reference that is not listed on this parent case (GRAMANN; ABF Algorithms...). This is listed as the first reference on PTO-1449 submitted on July 14, 2005, which is not considered as the examiner does not have a copy of this reference.

Claim Objections

7. Claims 27-28 are objected to because of the following informalities: Claims 27 and 28 recites identical limitations. Please delete one of them. Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. Claims 12, 15-16, 19-20, 23-24, 26 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakinami et al (US 5,892,855) (hereinafter, "Kakinami") in view of Shyu (Shyu, Haw-Jye; Applying morphological filters to acoustic broadband correlograms; Systems, Man, and Cybernetics, 1997. Computational Cybernetics and Simulation., 1997 IEEE International Conference on, Volume: 5, 1997 Page(s): 4182 –4187).

With regard to **claim 12**, a plurality of *distributed linear* arrays for receiving signals from a target, *each array of sensors comprising at least two sensors, said sensor array being non-parallel* is illustrated by Kakinami in figure 1a as the first, second, and third camera (please note that an **array** of sensor inherently includes more than one sensor); a receiver for receiving signals from the plurality of sensors is illustrated by Kakinami in figure 1A as the first, second, and third image processor; a digital storage device for storing the digitized data is illustrated by Kakinami in figure 6, reference number 15a and explained in column 8, lines 46-53; a computer system (Kakinami in figure 6, reference number 11 as the CPU) retrieving the stored digitized data from the plurality of sensor arrays is illustrated by Kakinami et al in figure 6, reference number 11. However, Kakinami do not explicitly explain processing the data through the use of a composite Hough transform to a delay curve to determine the track of the target. Shyu discloses this on page 4183, second column, third paragraph where the corresponding delay curve is calculated for the first and second arrays.

A computer and data storage device would be required and inherent in any object tracking system, including Shyu, to allow processing of the input data from the sensors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a data storage device and computer, as suggested by Kakinami, in the system of Shyu because such devices are required to collect object motion data to use in an object tracking system and because Shyu explains that data from

multiple sensors, such as the sensors of Kakinami, may be used to detect objects close to the sensor system.

It is also obvious to one of ordinary skill in that art and evidenced by claims 14-18 of the instant application that many types of sensors may be used to collect information about a scene of interest, including the electromagnetic sensors of Kakinami. Furthermore, by using different types of sensors, the processing (CHT) performed to track an object in Shyu is not altered. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a composite Hough transform to determine the track of an object in the system of Kakinami because the sensors of both system are directed towards tracking objects and the tracking would more consistent and effective.

Referring to **claim 15**, the sensors for retrieving data being electromagnetic sensors is illustrated by Kakinami in figure 6, reference number 16b as the first camera. This video camera is capable of sensing light, which is electromagnetic energy. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an electromagnetic sensor because radar is common in the military field.

Referring to **claim 16**, the sensors for retrieving signals from a target being optical sensors is illustrated by Kakinami in figure 6, reference number 16b as the first camera.

Referring to **claim 19**, the means for converting the signals received from the sensor arrays to a digital format is an analog-to-digital converter (Kakinami in figure 6, reference number 16c).

Referring to **claim 20**, the means for storing the digitized data from the sensor arrays being a computer is explained by Kakinami in column 8, lines 60-67.

With regard to **claim 23**, A method of processing data from at least two sensor arrays to determine the track of a target, each sensor array having at least two sensors, the sensor arrays being

arranged no-parallel to each other (Kakinami in figure 1a as the first, second, and third camera ; please note that an **array** of sensor inherently includes more than one sensor), the method, comprising: computing a hypothesis reference track relative to a primary/second sensor array of the at least two sensor arrays (Hypothesizing a reference track relative to a primary sensor array is explained by Shyu on page 4183, second column, second paragraph. Hypothesizing a reference track relative to a second sensor array is not explicitly explained by Shyu, however, Shyu does suggest using a two-sensor system in the abstract. Furthermore, a multi-sensor system illustrated by Kakinami in figure 1a maybe used, wherein a reference track would be hypothesized for each sensor array and therefore, a reference track relative to the secondary array would be hypothesized.); calculating an associated delay curve in a primary correlogram for the primary sensor array (Shyu on page 4183, second column, third paragraph); calculating an associated delay curve in a secondary correlogram for the secondary sensor array (the associated delay curve, page 4183 second column third paragraph, is calculated for the secondary array in a multi-sensor system suggest by Shyu); accumulating data for the reference track by simultaneously integrating a series of pixel values along the appropriate delay curve in the primary and secondary correlograms is explained by Shyu on page 4183, second column, second paragraph; storing the accumulated pixel values in composite Hough space is explained by Shyu on page 4183, second column, second paragraph; thresholding the accumulated pixel values to detect the track is explained by Shyu on page 4183, second column, second paragraph.

A computer and data storage device would be required and inherent in any object tracking system, including Shyu, to allow processing of the input data from the sensors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a data storage device and computer, as suggested by Kakinami et al, in the system of Shyu because such devices are required to collect object motion data to use in an object tracking system and because Shyu explains that

data from multiple sensors, such as the sensors of Kakinami, may be used to detect objects close to the sensor system.

Referring to **claim 24**, the sensors for receiving signals for a target are disclosed by Kakinami. However, Kakinami does not expressly disclose having these arrays arranged perpendicular to each other. It would have been an obvious matter of design choice to modify the system of Kakinami and Shyu by arranging sensors perpendicular to each other, since the Applicant has not disclosed that arranging sensors in perpendicular solves any stated problem or is for any particular purpose and it appears that the sensors ranged perpendicular to each other would perform equally as well as sensors disclosed by Kakinami to derive information of on object.

Claim 26 recites identical features as claim 15. Thus, arguments similar to that presented above for claim 15 is equally applicable to claim 26.

With regard to **claim 29** Shyu discloses composite Hough Transform to the delay curve on page 4183, second column, third paragraph to reduce ambiguity between the track of the target and a mirror to track of the target.

Claim 30 recites identical features as claim 23. Thus, arguments similar to that presented above for claim 23 is equally applicable to claim 30.

With regard to **claim 31** Shyu discloses integrating said series of pixels values along the appropriate delay curve in each primary and secondary correlograms and further combining the integrands by multiplication (page 4183, second column, third paragraph including equation 1).

Claim 32 recites identical features as claim 23. Thus, arguments similar to that presented above for claim 23 is equally applicable to claim 32.

9. Claims 14, 17 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakinami in view of Shyu, and further in view of Monroe (U.S. 5,798,458).

Referring to **claim 14**, the sensors for receiving signals for a target being acoustic sensors is not explicitly explained by Kakinami or Shyu. However, Monroe illustrates a plurality of acoustic sensors in figures 2 and 3, reference numbers 19a to 19m. The plurality of acoustic sensors illustrated by Monroe are capable of collecting object motion data under water. Therefore, it would have been an obvious matter of design choice to modify the system of Kakinami and Shyu by using an acoustic sensor, since the Applicant has not disclosed that using an acoustic sensor solves any stated problem or is for any particular purpose and it appears that acoustic sensors would perform equally as well as electromagnetic sensors to derive motion information of on object.

Referring to **claim 17**, the receiver being an acoustic receiver is not explained by Kakinami or Shyu. However, Monroe illustrates a multiplexer (96) and Digital Signal Processor (296) in figures 2 and 3 to receive the signals from the acoustic sensors. The plurality of acoustic receivers illustrated by Monroe are capable of collecting object motion data under water. Therefore, it would have been an obvious matter of design choice to modify the system of Kakinami and Shyu by using an acoustic receiver, since the Applicant has not disclosed that using an acoustic receiver solves any stated problem or is for any particular purpose and it appears that acoustic receivers would perform equally as well as electromagnetic receivers to derive motion information of on object.

Claim 25 recites identical features as claim 14. Thus, arguments similar to that presented above for claim 14 is equally applicable to claim 25.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kakinami in view of Shyu, and further in view of Holmberg (U.S. 5,838,816).

Referring to **claim 18**, the receiver being a sonar signal receiver is not explicitly explained by either Kakinami et al or Shyu. However, Holmberg illustrate a sonar receiver in figure 2 as reference number 12. Therefore, it would have been an obvious matter of design choice to modify the system of

Kakinami et al and Shyu by using a sonar signal receiver, since the Applicant has not disclosed that using a sonar signal receiver solves any stated problem or is for any particular purpose and it appears that sonar signal receivers would perform equally as well as electromagnetic receivers to derive motion information of on object.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali D. Patel whose telephone number is 571-272-7396. The examiner can normally be reached on M-F 8:00am - 5:00pm (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shefali D Patel
Examiner
Art Unit 2621

September 20, 2005